ASSIGNMENT 3

Textbook Assignment: "Internal Combustion Engines," "Speed Controlling Devices," and "Refrigeration and Air Conditioning," chapters 3, 4, and 5, pages 3-23 through 5-9.

3-1. An engine cannot be cranked, but it can be barred over. Which of the following is the most probable fault?

1. Improper throttle setting
2. Tripped overspeed device
3. Engaged jacking gear interlock
4. Seized piston

3-2. In an engine that cannot be cranked, but can be barred over, which of the following systems is the most probable source of trouble?

1. Starting
2. Fuel
3. Ignition
4. Lubrication

3-3. Which of the following troubles may be detected through the scavenging air port?

1. Stuck piston rings
2. Seized bearing
3. Faulty air-starting distributor
4. Scored bearing

3-4. What causes most of the troubles in a direct mechanical lift air-starting system?

1. Insufficient lubrication
2. Improper adjustments
3. Dirt and gum deposits
4. Inadequate cooling

3-5. On a rotary distributor timing mechanism, what should you use to check the contact between the rotor and the body?

1. Feeler gauge
2. Prussian blue
3. Clearance light
4. Micrometer

3-6. Which of the following practices tends to reduce or eliminate the formation of gummy deposits that cause upper and lower pistons of pressure-activated air-starting valves to stick in the cylinders?

1. Increasing the tension of the valve return springs
2. Draining the storage tanks and water traps of the air-starting system
3. Jacking the engine over manually before starting to free any valves that may be stuck
4. Decreasing the tension of the valve return springs

3-7. If the upper piston of an air-actuated starting valve sticks because of gummy deposits, what action should you take?

1. Force alcohol around the pistons
2. Blow clean hot air around the pistons
3. Put light oil or diesel fuel around the piston and work the valve up and down
4. Remove the piston and buff it with jeweler's rouge

3-8. In general, what should you do if a pressure-actuated air-starting valve is not functioning properly because of a weak return spring?

1. Place another washer on top of the valve stem
2. Replace the castellated nut with a heavier one
3. Restress the valve return spring
4. Install a new valve return spring

3-9. What is the main source of fuel pump and injection system troubles?

1. Contaminated fuel
2. Improper adjustments
3. Coated fuel lines
4. Excessive vibration

3-10. Metal fatigue in the nipples of a fuel system is usually caused by which of the following factors?

1. Leakage
2. High injection pressure
3. Vibration
4. Erosion

3-11. What are the two main causes of leakage in fuel tanks?

1. Corrosion and excessive fuel line pressure
2. Metal fatigue and improper welds
3. Vibration and metal fatigue
4. Clogged fuel lines and corrosion

3-12. Which of the following problems is likely to cause failure of a diesel engine mechanical governor?

1. Faulty oil seals
2. Bound control linkage
3. Defective cold starting valve
4. Low oil level

3-13. Which of the following actions will cause the overspeed safety device of an engine to become inoperative?

1. Trying to start the engine with low air-starting pressure
2. Tripping the device accidentally while trying to start the engine
3. Shutting off the fuel supply after starting the engine
4. Shutting off the air supply after starting the engine

3-14. Most diesel engines are equipped with a special means of cutting off their air or fuel supply in an emergency. In which of the following situations would the special means be used?

1. Engine cannot be cranked or barred over
2. Parts of the exhaust system are obstructed
3. Fuel oil injection system is not properly timed
4. Overspeed safety device does not operate when speed becomes excessive

3-15. Slow cranking of a cold diesel engine may be caused by the use of which of the following substances?

1. Detergent lube oil
2. High viscosity lube oil
3. Centrifuged lube oil
4. Low viscosity lube oil

3-16. What diesel engine system is likely to be at fault if a cylinder misfires regularly?

1. Lubrication
2. Fuel
3. Exhaust
4. Ignition

3-17. A cylinder compression leak is indicated when the pressure in a particular cylinder of an engine signals which of the following conditions?

1. It is much higher than the pressure in the other cylinders
2. It is much lower than the pressure in the other cylinders
3. It fluctuates from normal to much below specified pressure
4. It fluctuates from normal to much above specified pressure

3-18. If the water in the cooling system of a diesel emergency generator overheats because the thermostat fails to function, what corrective action should you take?

1. Clean the bellows of the element
2. Adjust the tension of the regulator spring
3. Clean the freshwater cooler
4. Replace the thermostat

3-19. In the Fulton-Sylphon automatic temperature regulator, what happens if you decrease the spring tension?

1. The velocity of the cooling water decreases
2. The temperature range of the regulator increases
3. The temperature range of the regulator decreases
4. The velocity of the cooling water increases

3-20. Which of the following troubles in the engine exhaust system will cause back pressure?

1. Obstruction in the combustion space
2. Thermostat failure
3. Restricted exhaust
4. Restricted oil filter

3-21. After being cleaned, most oil bath-type engine air cleaners should be refilled to what level?

1. To the full mark
2. Slightly above the full mark
3. To the halfway mark
4. Slightly less than the halfway mark

3-22. Which of the following conditions can damage the turbine blading of a turbocharger?

1. Foreign objects
2. Bearing failure
3. Overspeeding
4. Each of the above

3-23. Which of the following conditions will NOT cause scoring of blower parts?

1. Dirty lube oil
2. Worn gears
3. Improper timing
4. Improper end clearance

3-24. How can you determine whether blower rotor gears are worn excessively?

1. Measure the clearance between the leading and the trailing edges of the rotor lobes
2. Measure the backlash of the gear set
3. Measure the clearance between the rotor lobes and the casing
4. Check the timing of the rotors

3-25. Which of the following conditions is a major contributing factor to diesel engine power loss, starting failure, and frequent stalling?

1. High cooling water temperature
2. Faulty operation of the governor
3. Improperly engaged jacking gear
4. Faulty air-starting distributor

3-26. If you are checking an engine for a stuck fuel control rack, what should you do immediately after disconnecting the linkage to the governor?

1. Visually inspect the rack
2. Try to move the rack by hand
3. Test the return springs
4. Clean the removed rack

3-27. A leaking fuel injector may cause an engine to

1. stop
2. overheat
3. operate better
4. continue to operate when you attempt to shut it down

3-28. Under which of the following conditions will a properly operating engine governor fail to have any control over a sudden increase in speed?

1. Injector leakage during operation
2. Sudden drawing of lube oil into the cylinders from the air box
3. Manifold explosion due to excessive accumulation of oil
4. Inoperative cylinder relief valve due to a stuck spring

3-29. Before installing a new blower oil seal, what must you do to the oil seal first?

1. Wash it in a detergent
2. Spray it with paraffin
3. Blow some air through it
4. Soak it in clean, light lube oil

3-30. What must you do to an improperly operating safety valve when it is removed from an engine cylinder?

1. Reset the spring tension
2. Replace the shear pin
3. Machine and lap the valve
4. Replace it with a new one

3-31. If the exhaust ports of an engine become clogged during operation, which of the following conditions is a possible result?

1. High exhaust temperatures
2. Overheating of the engine
3. Popping of the cylinder safety valves
4. Each of the above

3-32. When cleaning the cylinder ports of an engine, you can prevent carbon from entering the cylinder by performing which of the following actions?

1. Using a vacuum cleaner while brushing off the carbon
2. Jacking the engine over to a position that the piston blocks the port
3. Covering the inside of the cylinder
4. Brushing off the carbon away from the cylinder direction

3-33. What kind of noise will most likely be coming from an engine operating with a broken engine part?

1. Rattling
2. Clicking
3. Pounding
4. Knocking

3-34. The color of the exhaust smoke of an engine can NOT be used as an aid in which of the following circumstances?

1. Troubleshooting
2. Testing for fuel contamination
3. Determining engine performance
4. Determining serious engine troubles

3-35. An explosion may occur if a cigarette is lit near a storage battery because of the presence of

1. hydrogen gas
2. carbon monoxide
3. sulphuric acid
4. gasoline fumes

3-36. Failure of a gasoline engine starting motor to run may be caused by corroded, loose, or burned battery terminals.

1. True
2. False

3-37. When the starting motor of a gasoline engine turns but fails to crank the engine, the trouble is usually found in the

1. drive assembly
2. engine timing
3. fuel system
4. ignition system

3-38. Which of the following problems can result from overpriming a gasoline engine?

1. An overheated engine
2. An inoperative fuel pressure gauge
3. Stuck piston rings
4. Corroded piston crowns

3-39. You are checking for trouble in a fuel system that has a wobble pump. If the pump feels or sounds dry, where is the trouble probably located?

1. In the carburetor
2. In the line to the fuel pump
3. In the fuel pump
4. Between the fuel pump and the supply tanks

3-40. If a gasoline engine with a battery-type ignition system fails to stop, what is the most likely cause?

1. The switch contact points are open
2. The ground connection is open
3. The switch contact points are closed
4. The battery terminals are burned

3-41. Oil purifiers are designed to give maximum efficiency when you operate the purifier at what limits?

1. Minimum speed
2. A speed determined by prevailing conditions
3. A speed between minimum and maximum and below the rated capacity
4. Maximum designed speed and rated capacity

3-42. Most oil used by the Navy can be heated to what maximum temperature without damaging the oil?

1. 195°F
2. 190°F
3. 185°F
4. 180°F

3-43. When the military symbol 9250 lube oil is to be purified, it should be heated to what specific temperature?

1. 140°F
2. 160°F
3. 175°F
4. 180°F

3-44. The size of the discharge ring used in a purifier is determined by which of the following factors?

1. Viscosity of the oil
2. Moisture content of the oil
3. Sediment content of the oil
4. Specific gravity of the oil

3-45. What is the best method of determining the efficiency of a purifier?

1. Oil clarity check
2. Oil analysis
3. Batch process
4. Bowl sediment check

3-46. Which of the following corrective measures should you use to reduce the number of engine governor difficulties?

1. Reduce the engine speed
2. Increase the engine load
3. Use clean oil
4. Adjust the fuel linkage

3-47. When installing a new or overhauled governor, which of the following governor components should you adjust?

1. Governor linkage
2. Compensating needle valve
3. Speed adjusting screw
4. Speeder spring

3-48. When the governor compensating needle valve is correctly adjusted, the engine will behave in which of the following manners during load changes?

1. Maintain low underspeeds
2. Maintain high overspeeds
3. Return slowly to normal speeds
4. Return quickly to normal speeds

3-49. An increase in load for any constant throttle setting of a mechanical governor will be accompanied by a decrease in

1. engine speed
2. spring length
3. fuel pressure
4. oil temperature

3-50. The mechanical governor controls the engine maximum speed when the centrifugal force of both sets of flyweights act against which of the following parts?

1. The buffer spring
2. The light spring
3. The heavy spring
4. Each of the above

3-51. Which of the following is NOT a cause of improper speed fluctuation of an engine equipped with a mechanical governor?

1. Constantly changing loads
2. Misfiring engine cylinders
3. A binding governor linkage
4. High lube oil temperature

3-52. When you are in the process of assembling a governor, which of the following materials is recommended for use on the sealing gasket?

1. Shellac
2. Hard grease
3. Soft grease
4. Lube oil

3-53. An overspeed trip will stop a diesel engine that is equipped with a speed governor when the regular speed governor fails to perform which of the following actions?

1. Limit the load on the engine
2. Keep the engine within its maximum designed limit
3. Adjust to higher engine loads
4. Reduce engine hunt

3-54. A broken drive shaft of a hydraulic overspeed trip will cause uncontrolled engine speed because the flyweights would

1. disconnect from the shaft
2. remain in the distended position
3. cease to exert centrifugal force
4. increase in rotative speed

3-55. What controls the output of a high-speed refrigeration compressor?

1. The box temperature
2. The loading and unloading of compressor cylinders
3. The low-pressure switch
4. The solenoid valve

IN ANSWERING QUESTION 3-56, REFER TO FIGURE 5-3 OF THE TEXTBOOK.

3-56. What will happen when an increase in oil pump pressure causes the piston of the capacity control valve to move against spring A?

1. More cylinders will become loaded and the compressor output will increase
2. More cylinders will become unloaded and the compressor output will decrease
3. The regulating valves will relieve the oil pressure
4. The compressor output will remain the same

3-57. A refrigerant compressor has been overhauled. What is the first step you should take to remove the air from the compressor?

1. Disconnect the connection in the discharged gauge line between the stop valve and the compressor
2. Disconnect the connection on the compressor suction line
3. Start the compressor and let it run until a vacuum is obtained
4. Remove all oil from the compressor crankcase

3-58. You are trying to locate the refrigeration purge valve. Most likely you can find the valve in which of the following locations?

1. At the bottom of the condenser
2. At the top of the condenser
3. At the midsection of the condenser
4. On the condenser gauge line

3-59. In which of the following areas would air that enters a refrigeration plant tend to collect?

1. Upper part of the receiver
2. Upper part of the condenser
3. Inlet end of the condenser
4. Downstream end of the cooling coil

3-60. In a refrigeration system, what is the purpose of the purge valve?

1. To take out unpleasant fumes from the refrigerant
2. To vent off excess refrigerant during an emergency
3. To remove any air that may accumulate in the system
4. To permit the opening of the refrigeration system for cleaning and inspecting

3-61. On an air-cooled condenser, the exterior surfaces of the tubes and fins are dirty and restricting air circulation. Which of the following items should you use to clean these surfaces?

1. Jets of steam
2. Hot-water lances
3. Compressed-air lances
4. Stiff-bristled brushes

3-62. You are testing the condenser tubes for leakage. Why do you hold the exploring tube of the leak detector at one end of each condenser tube for about 10 seconds before driving a cork into each end of the tube?

1. To dry the tube heads
2. To detect the presence of R-12
3. To draw fresh air through the tube
4. To vaporize any water left in the tube

3-63. You are attempting to locate leaks in a refrigeration condenser. Before continuing the tests, you should allow the condenser to remain idle for what minimum period of time after all tubes in the suspected section have been corked?

1. 2 to 4 hr
2. 4 to 6 hr
3. 6 to 8 hr
4. 8 to 10 hr

3-64. When the thermostatic valve is operating properly, how does the temperature at the outlet side of the valve compare with the temperature at the inlet side?

1. The temperature is lower at the outlet side
2. The temperature is lower at the inlet side
3. The temperature is approximately the same at the outlet and the inlet sides

3-65. Which of the following factors can cause a thermostatic expansion valve to operate improperly?

1. A collection of dirt on the control bulb
2. A collection of Freon at the valve seat
3. A collection of dirt at the valve orifice
4. Each of the above

3-66. As a rule, about how many degrees of superheat are picked up by the refrigerant vapor before it leaves the cooling coil?

1. Between 4°F and 12°F
2. Between 15°F and 20°F
3. Between 30°F and 38°F
4. Between 45°F and 50°F

3-67. In a refrigerant plant, liquid refrigerant may flood back to the compressor from the evaporator if the thermostatic expansion valve is in which of the following situations?

1. Stuck shut
2. Adjusted for too high a degree of superheat at the outlet
3. Adjusted for too low a degree of superheat at the outlet

3-68. If you suspect that the expansion valve assembly requires replacement, which of the following conditions should be met before making an expansion valve test?

1. The liquid strainers should be cleaned
2. The solenoid valves should be operational
3. The system should be sufficiently charged
4. All of the above

3-69. A service drum that is used for testing an expansion valve should contain which of the following gases?

1. Pressurized R-12
2. Wet compressed air
3. Oxygen gas
4. Each of the above

3-70. You are testing the thermostatic expansion valve of a refrigeration plant. When should you immerse the thermal element in a bath of crushed ice?

1. Before the valve inlet is attached to the gas source
2. After the high-pressure and low-pressure gauges have been connected
3. Before the high-pressure gauge is connected to the valve outlet
4. After the valve on the air supply line has been opened

3-71. A thermostatic expansion valve is set for 5°F of superheat. What should be the outlet pressure on the gauge?

1. 16.1 psig
2. 22.5 psiq
3. 26.1 psig
4. 32.5 psiq

3-72. Which of the following operating conditions is an indication that the expansion valve is seating properly?

1. Pressure stops increasing after a few pounds
2. Pressure will build up slowly
3. Both 1 and 2 above
4. Pressure increases rapidly and equals the inlet pressure

3-73. You have removed the ice packing from the control bulb. Which of the following outlet pressure conditions indicates that the valve is operating properly?

1. The pressure does not change
2. The pressure decreases rapidly
3. The pressure decreases a few pounds and then stabilizes
4. The pressure increases rapidly

3-74. Under normal operating conditions, the receiver of a properly charged refrigeration system should be at what level when the compressor stops?

1. 25 percent full
2. 50 percent full
3. 85 percent full
4. 100 percent full

3-75. Which of the following actions should you take before tightening the cap on a cleaned liquid line strainer?

1. Test the strainer for leaks
2. Open the strainer outlet valve
3. Purge the air out of the strainer
4. Replace the strainer screen spring